Claim Listing

Please amend the claims and enter new claims as follows:

18. (canceled) ~~An apparatus comprising: a first electrode positioned in a first plane and a second electrode positioned in a second plane different from the first plane, the first and the second electrode each comprising a substantially planar electrode and said electrodes being in a substantially parallel alignment; and a gap between the first and the second electrode, the gap being capable of containing accommodating a polarizable liquid medium in which a plurality of particles may be suspended, wherein the first and the second electrodes are configured so that when an AC voltage is applied between the electrodes, with the polarizable liquid medium located in said gap, an electric field is generated at an interface between the second electrode and the polarizable liquid medium, and wherein the second electrode comprises either~~

~~(a) a planar light-sensitive electrode, wherein the apparatus controls the movement of the particles or the liquid medium is controlled at the interface when the electric field is generated at the interface and the interface is illuminated with a predetermined light pattern~~

~~or~~

~~(b) a planar electrode having a surface and an interior, said surface or interior having been patterned to modify the properties of the second electrode affecting the local distribution of the electric field at the interface, wherein the apparatus controls the movement of the particles or the liquid medium is controlled at the interface when the electric field is generated at said interface.~~

19. (currently amended) The apparatus of claim ~~18~~ 55 or 56, wherein the second electrode comprises a silicon electrode.

20. (previously canceled) ~~The apparatus of claim 18, further comprising a polarizable liquid medium located in said gap.~~

21. (currently amended) The apparatus of claim ~~20~~ 55 or 56, wherein the polarizable medium is an electrolyte solution.

22. (previously canceled) ~~The apparatus of claim 20, further comprising a plurality of particles located in said gap, wherein said particles are suspended in the liquid medium.~~

23. (currently amended) The apparatus of claim ~~18~~ 55 or 56, wherein the second electrode is the light sensitive electrode.

24. (previously presented) The apparatus of claim 23, wherein the light-sensitive electrode is patterned by spatially modulated oxide growth, surface chemical patterning or surface

profiling, wherein said patterning produces spatial modulation in properties of the second electrode, said properties affecting the local distribution of the electric field at said interface.

25. (previously presented) The apparatus of claim 24, wherein the modified properties comprises impedance.

26. (previously presented) The apparatus of claim 23, further comprising an electric field generator which generates the electric field at the interface and an illumination source for illuminating the interface.

27. (currently amended) The apparatus of claim ~~18~~ 55 or 56, wherein the second electrode comprises the planar patterned electrode and wherein the movement of the particles or the liquid medium at the interface is controlled when the electric field is generated at said interface.

28. (previously presented) The apparatus of claim 27, wherein the second electrode comprises a silicon electrode.

29. (previously presented) The apparatus of claim 27, wherein the surface or interior of the second electrode is patterned by spatially modulated oxide growth, surface chemical patterning or surface profiling, wherein said patterning produces spatial modulation in properties of the second electrode, said properties affecting the local distribution of the electric field at said interface.

30. (previously presented) The apparatus of claim 27, wherein the modified properties comprises impedance.

31. (previously presented) The apparatus of claim 27, further comprising an electric field generator for generating the electric field at the interface.

32. (previously presented) A method for controlling the movement of a polarizable liquid medium comprising the following steps: providing the apparatus of claim 23, wherein the gap between the first electrode and the light-sensitive electrode accommodates a polarizable liquid medium; generating an electric field at the interface between the liquid medium and the light-sensitive electrode; and illuminating the light sensitive electrode with a predetermined light pattern to create fluid flow having a direction substantially parallel to said light-sensitive electrode.

33. (previously presented) A method for controlling the movement of a polarizable liquid medium comprising the following steps: providing the apparatus of claim 23, wherein the gap between the first electrode and the patterned electrode accommodates polarizable liquid medium; and generating an electric field at the interface to create fluid flow, said fluid flow having a direction substantially parallel to said patterned electrode.

34. (previously presented) A method for controlling the movement of particles suspended at an interface between a polarizable liquid medium and an electrode, said method comprising the following steps: providing the apparatus of claim 23, wherein the gap between the first electrode and the light-sensitive electrode accommodates a plurality of particles suspended in a polarizable liquid medium; generating an electric field at the interface between the liquid medium and the light-sensitive electrode; and illuminating the light sensitive electrode with a predetermined light pattern to produce the movement of the particles.
35. (previously presented) The method of claim 34, wherein the movement of the particles is in a direction substantially parallel to said light-sensitive electrode.
36. (previously presented) The method of claim 34, wherein the movement of the particles is in a direction substantially orthogonal to the direction of the electric field.
37. (previously presented) The method of claim 34, wherein the movement of the particles results in formation of a planar assembly of substantially one layer of particles in a designated area of the light-sensitive electrode, wherein the designated area is defined by the pattern of illumination.
38. (previously presented) The method of claim 37, wherein the assembly comprises an array of particles.
39. (previously presented) The method of claim 34, wherein the light-sensitive electrode comprises a silicon electrode.
40. (currently amended) The method of claim 34, wherein the polarizable liquid medium is an electrolyte solution.
41. (previously presented) The method of claim 34, wherein the light-sensitive electrode is patterned by spatially modulated oxide growth, surface chemical patterning or surface profiling, wherein said patterning produces spatial modulation in properties of the second electrode, said properties affecting the local distribution of the electric field at said interface.
42. (previously presented) The method of claim 41, wherein the modified properties comprises impedance.
43. (previously presented) A method for controlling the movement of particles suspended at an interface between a polarizable liquid medium and an electrode, said method comprising the following steps: providing the apparatus of claim 27, wherein the gap between the first electrode and the patterned electrode accommodates a plurality of particles suspended in a polarizable liquid medium; and generating an electric field at the interface to produce the movement of the particles.
44. (previously presented) The method of claim 43, wherein the movement of the particles is in a

direction substantially parallel to said patterned electrode.

45. (previously presented) The method of claim 43, wherein the movement of the particles is in a direction substantially orthogonal to the direction of the electric field.

46. (previously presented) The method of claim 43, wherein the movement of the particles results in formation of a planar assembly of substantially one layer of particles in a designated area of the patterned electrode, wherein the designated area is defined by the properties of the patterned electrode affecting the local distribution of the electric field at the interface.

47. (previously presented) The method of claim 43, wherein the assembly comprises an array of particles.

48. (previously presented) The method of claim 43, wherein the patterned electrode comprises a silicon electrode.

49. (previously presented) The method of claim 43, wherein the polarizable medium comprises an electrolyte solution.

50. (previously presented) The method of claim 43, wherein the patterned electrode is patterned by spatially modulated oxide growth, surface chemical patterning or surface profiling.

51. (previously presented) The method of claim 50, wherein the modified properties comprises impedance.

52. (newly added) The apparatus of claim 18 further including means for providing a DC bias voltage between the first and second electrodes.

53. (newly added) The apparatus of claim 52 wherein the DC bias voltage is in the range from 1 to 4 V.

54. (newly added) The method of claim 32, 34 and 43 further including the step of providing a DC bias voltage between the first and second electrodes.

55. (newly added) An apparatus comprising first and second electrodes positioned to accommodate a fluid medium which may contain a plurality of polarizable particles, wherein the first and the second electrodes are configured relative to one another so that an electric field is generated within an interface between said fluid medium and at least one of said first or second electrodes when an AC voltage is applied between the electrodes in the presence of said fluid medium, and wherein at least one of said first and second electrodes comprises a light-sensitive electrode capable of controlling the movement of the particles and/or the fluid medium when an electric field is generated

within said interface and the light-sensitive electrode is illuminated with a predetermined light pattern.

56. (newly added) An apparatus comprising first and second electrodes positioned to accommodate a fluid medium which may contain a plurality of polarizable particles, wherein the first and the second electrodes are configured relative to one another so that an electric field is generated within an interface between said fluid medium and at least one of said first or second electrodes when an AC voltage is applied between the electrodes in the presence of said fluid medium, and wherein at least one of said first and second electrodes is physically or chemically patterned to distribute an electric field in a predetermined manner in order to control the movement of the particles and/or the liquid medium when an electric field is generated within said interface.